Reflections on 40 Years of Research and Telemetry: Where Will the Next Generation of Biologists and Technology Lead Us?

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Forward thinkers spend less time contemplating how far they’ve come than how far they have to go. In fields related to research and technology this is probably especially true, where we spend more time thinking about the next giant leap we prepare to take rather than the first baby step taken. It seems, however, that as I work my way toward the end of a career I often find myself in that nostalgic mindset to that place in the good old days (that seems like yesterday) lost in thoughts of ‘...wow, I can’t believe that’s how we used to...’

I grew up on the plains of Colorado where the annual cycle of nesting Swainson’s hawks and wintering rough-legged hawks sparked my interest in elementary school. Where do they go? Do the same birds return every year? I was fortunate that my father was an aerospace engineer, and after this he was a basement tinkerer.

As a researcher with the Washington Department of Fish and Wildlife, I initiated a satellite telemetry study on bald eagle migration in the mid-1990s to take advantage of this new technology. The process for public use of the Argos system was just being established, and while the paperwork was deep and the learning curve was steep, the rewards were plentiful. Over the course of 4 years, through funding from the US Fish and Wildlife Service, we monitored 35 adult eagles in Washington with 95g Argos PTTs to identify their movement corridors and identify their origins. We provided the movement data to the online science program “Journey North” for elementary students to track movements of tagged eagles in real-time. The advantages of satellite telemetry became obvious quickly: regular transmission of a large number of fixes that were accurate enough to determine flight corridors, monitor mortality, and could be uploaded conveniently via computer. We monitored individual eagles up to 7 years with PTTs that began to give a picture of the dynamics of lifetime movement patterns. Technology rewarded the researchers’ push for smaller, lighter transmitters in 2001 and we used the opportunity to combine research with Microwave Telemetry’s (MTI) school-based, “ScienceTech-nology in the Classroom.”

MTI awarded a scholarship to Liberty Bell High School in Twisp, Washington. Working with the students and Kent Woodruff of the Forest Service, we deployed solar Argos PTTs on Cooper’s hawks and a northern harrier at Hawkwatch International’s Chelan Ridge migration site in north-central Washington. The program provided the students at Liberty Bell High School first-hand research experience by allowing them to handle the raptors and map their latitude and longitude as we tracked them to the Great Basin.

In the mid-2000s satellite-tracking technology of birds reached another milestone with the ability to acquire global positioning system (GPS) fixes. In 1999, we initiated a study of the wintering ecology of ferruginous hawks to better understand range-use patterns and survival for this state-listed species. We deployed Argos PTTs on 13 adult and 15 juvenile hawks in 2001, Dan Svingen of the Forest Service, and Bob McCready of The Nature Conservancy were aware of John and Frank Swaineon’s work with woodpeckers and bats, and how capturing data on Argos PTTs in 2005. It was quickly apparent that this new technology provided a much better “behavioral” stamp than we could capture from birds with Argos PTTs because the high accuracy of fixes afforded the ability to delineate precise locations and altitude, and acquisition of sensor information on bird flight speed and altitude. In my experience, one of the biggest dividends has always been the inability to collect behavioral information to complement movement data, that is best gleaned through focal observation of marked or radioed birds. So GPS PTTs provided a good way to bridge the gap.

As we look to the next generation, technology reaches for even lighter, more powerful, and longer-lived transmitters. In the meantime, the next generation of biologists is preparing to take the reins to test new technologies, including my son Jesse who is studying ferruginous hawks through the University of Alberta, which opened his first Argos program earlier this year. So, the cycle continues...oh, and rough-legged hawks! A couple of years ago we finally telemetered three rough-legged hawks with PTTs and tracked them to Alaska.

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